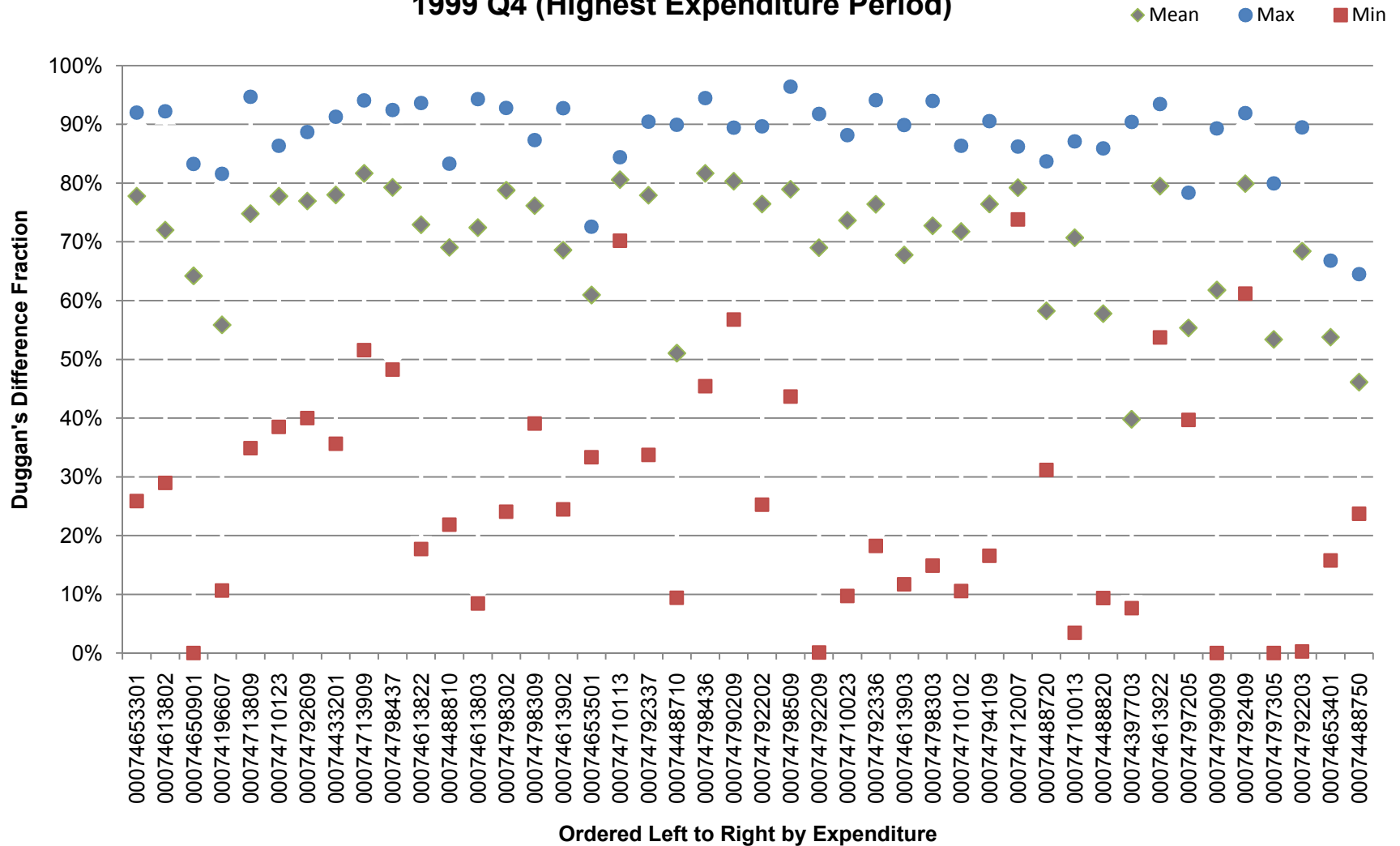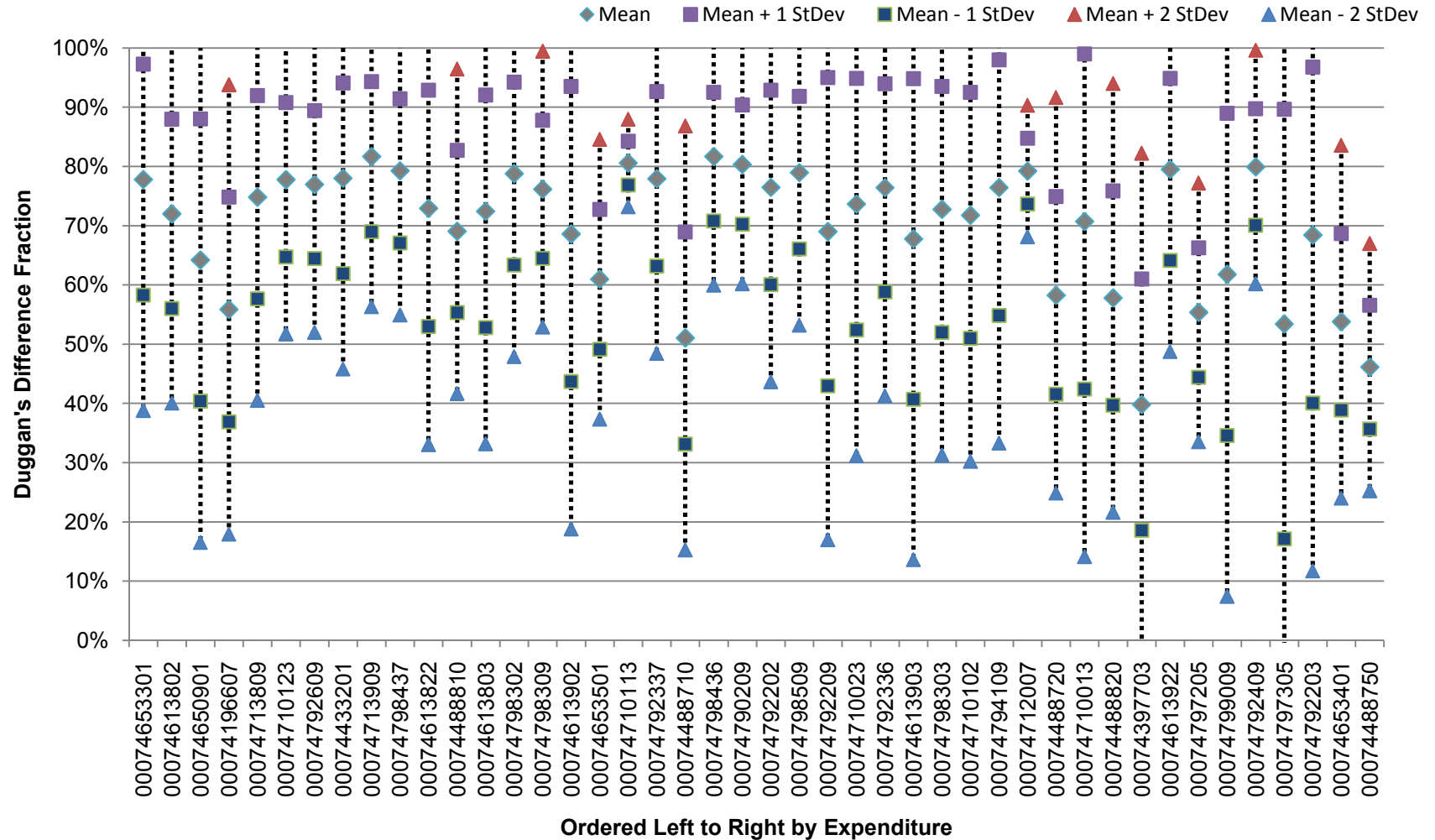**Dr. Duggan's Calculations Demonstrate Significant Variability Across the 19 States He Analyzed in the Impact of His Revised Prices**
1999 Q4 (Highest Expenditure Period)

Legend: Mean, Max, Min

Y-axis: Duggan's Difference Fraction (0% to 100%)

X-axis: Ordered Left to Right by Expenditure

X-axis labels:
00074653301, 00074613802, 00074650901, 00074196607, 00074713809, 00074710123, 00074792609, 00074433201, 00074713909, 00074798437, 00074613822, 00074488810, 00074613803, 00074798302, 00074798309, 00074613902, 00074653501, 00074710113, 00074792337, 00074488710, 00074798436, 00074790209, 00074792202, 00074798509, 00074792209, 00074710023, 00074792336, 00074613903, 00074798303, 00074710102, 00074794109, 00074712007, 00074488720, 00074710013, 00074488820, 00074397703, 00074613922, 00074797205, 00074799009, 00074792409, 00074797305, 00074792203, 00074653401, 00074488750

Source: Dr. Duggan "38" dta files; Additional 9 State "log" files as summarized in Medicaid_Diff_Frac.Variation.xls

Standard Deviation of Difference Fractions Across the 19 States Dr. Duggan Analyzed 1999 Q4 (Highest Expenditure Period)
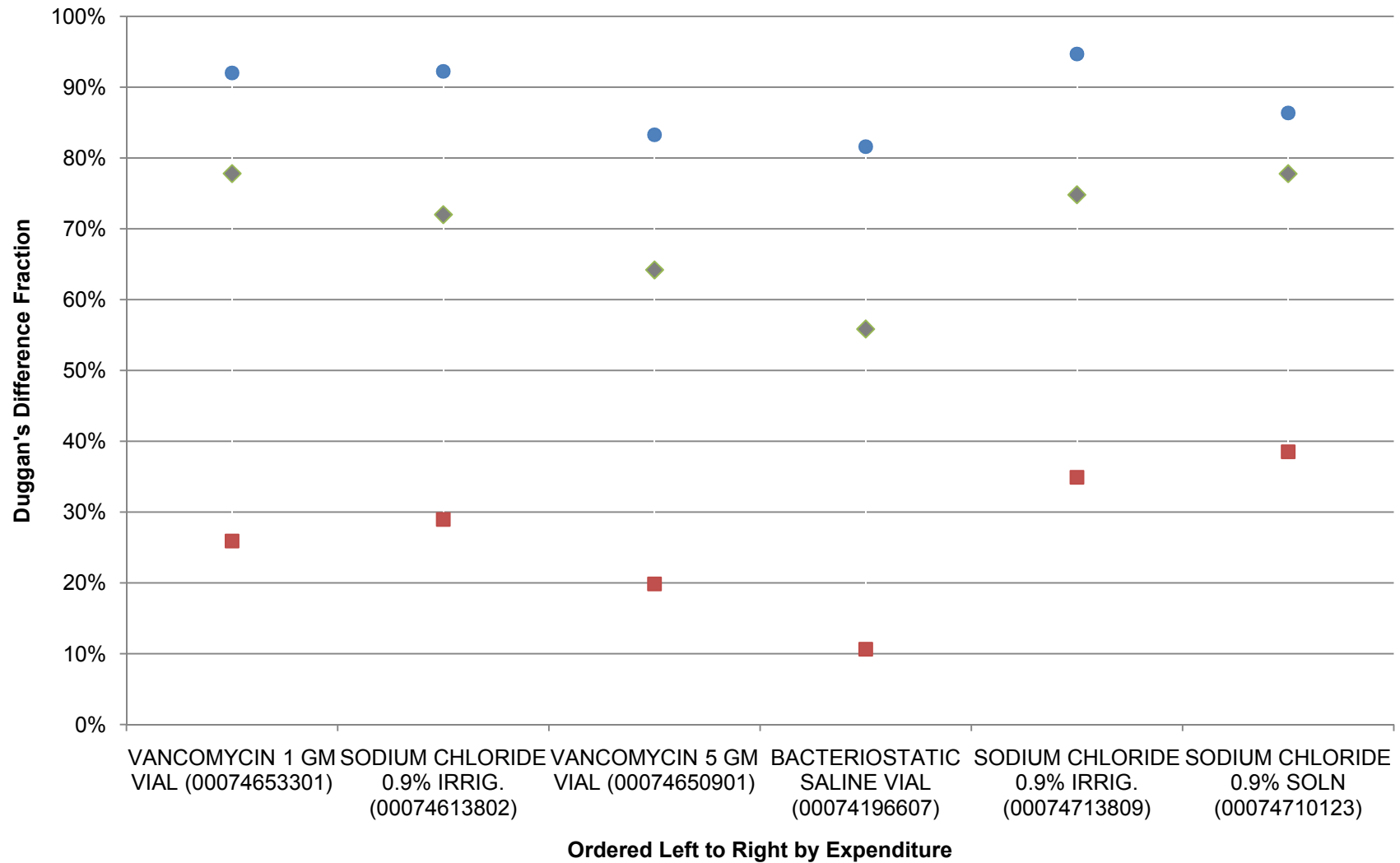
Legend: Mean ◆ | Mean + 1 StDev ■ | Mean - 1 StDev ■ | Mean + 2 StDev ▲ | Mean - 2 StDev ▲

Y-axis: Duggan's Difference Fraction (0% to 100%)

X-axis: Ordered Left to Right by Expenditure

X-axis labels:
00074653301, 00074613802, 00074650901, 00074196607, 00074713809, 00074710123, 00074792609, 00074433201, 00074713909, 00074798437, 00074613822, 00074488810, 00074613803, 00074798302, 00074798309, 00074613902, 00074653501, 00074710113, 00074792337, 00074488710, 00074798436, 00074790209, 00074792202, 00074798509, 00074792209, 00074710023, 00074792336, 00074613903, 00074798303, 00074710102, 00074794109, 00074712007, 00074488720, 00074710013, 00074488820, 00074397703, 00074613922, 00074797205, 00074799009, 00074792409, 00074797305, 00074792203, 00074653401, 00074488750

Source: Dr. Duggan "38" dta files; Additional 9 State "log" files as summarized in Medicaid_Diff_Frac.Variation.xls

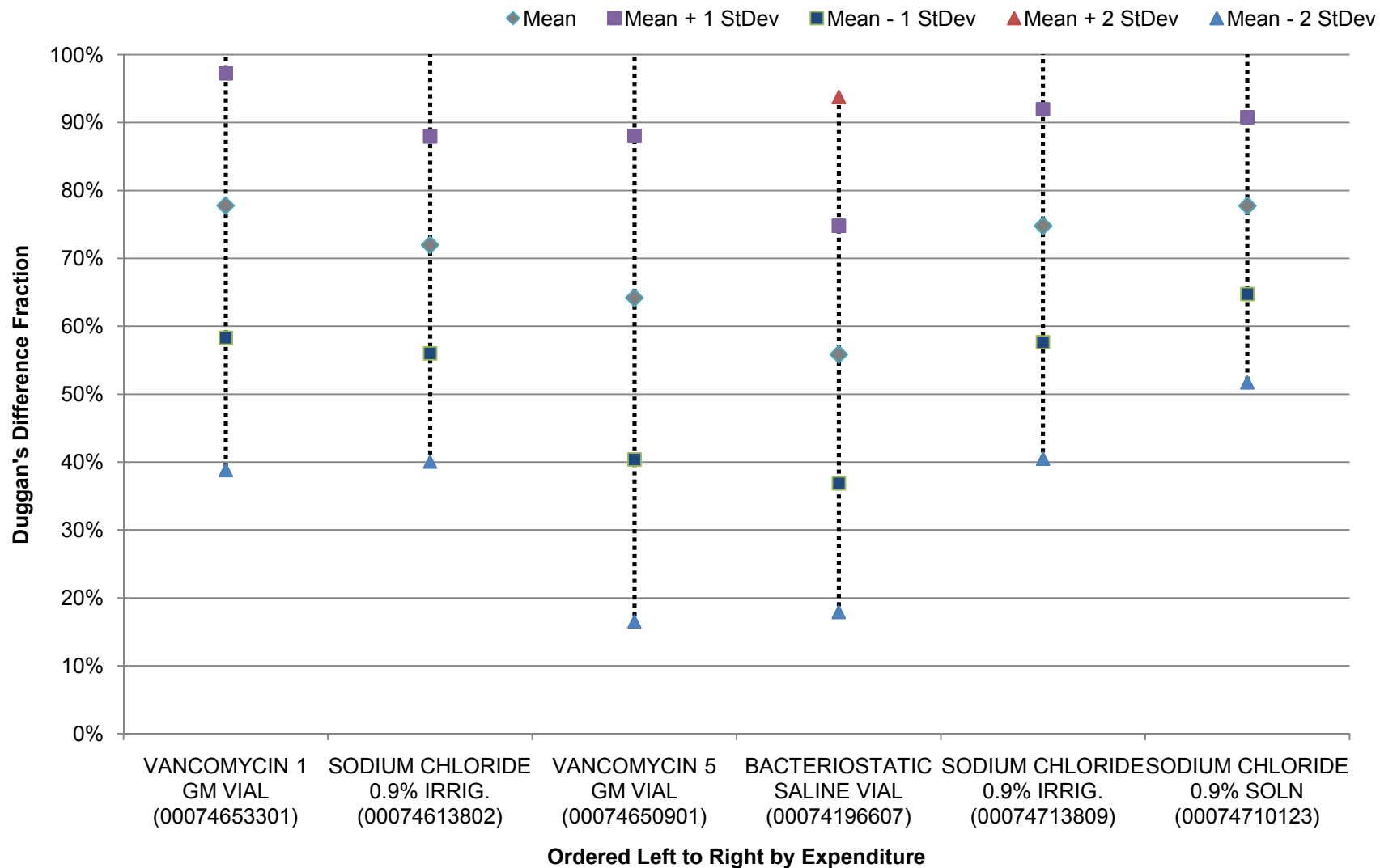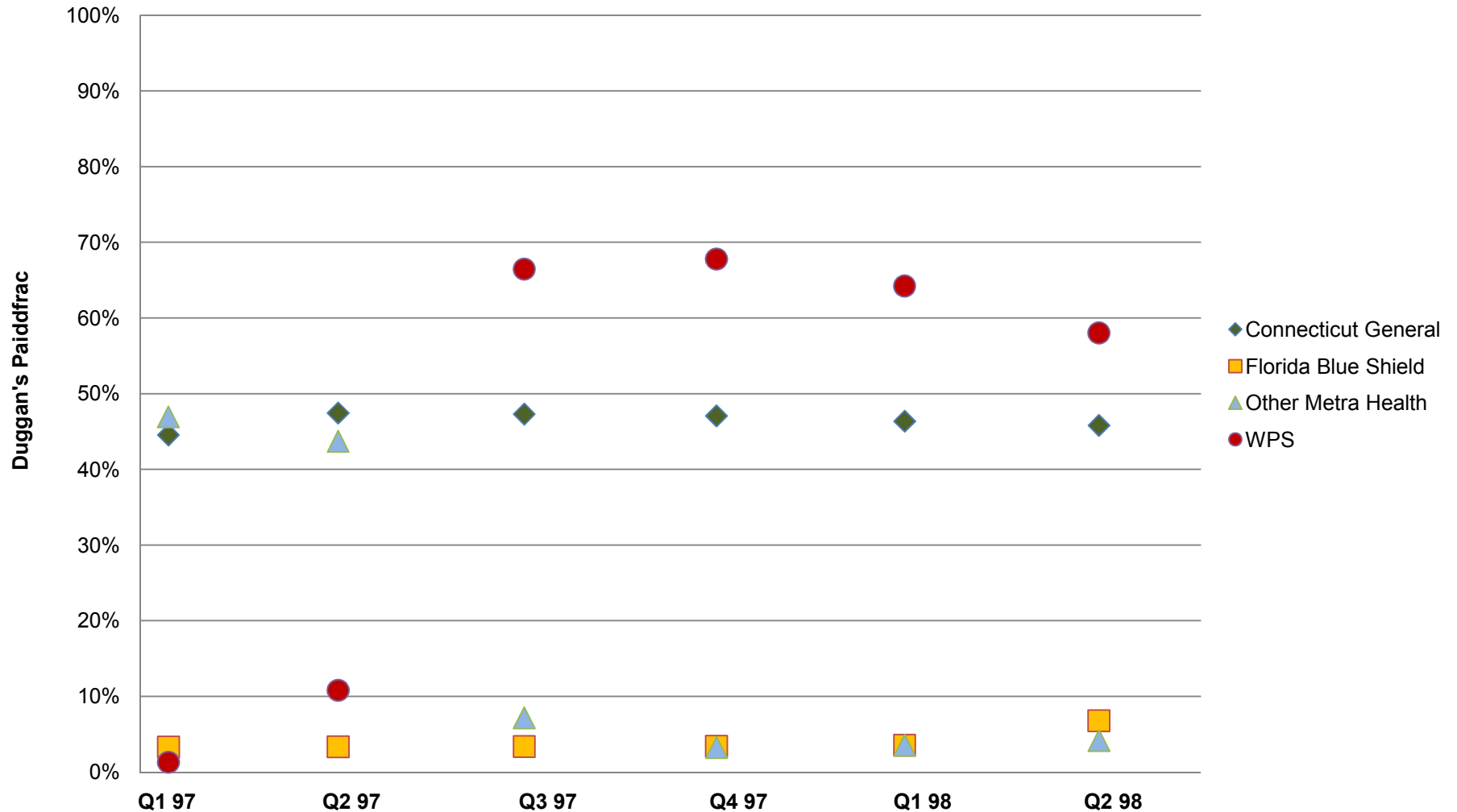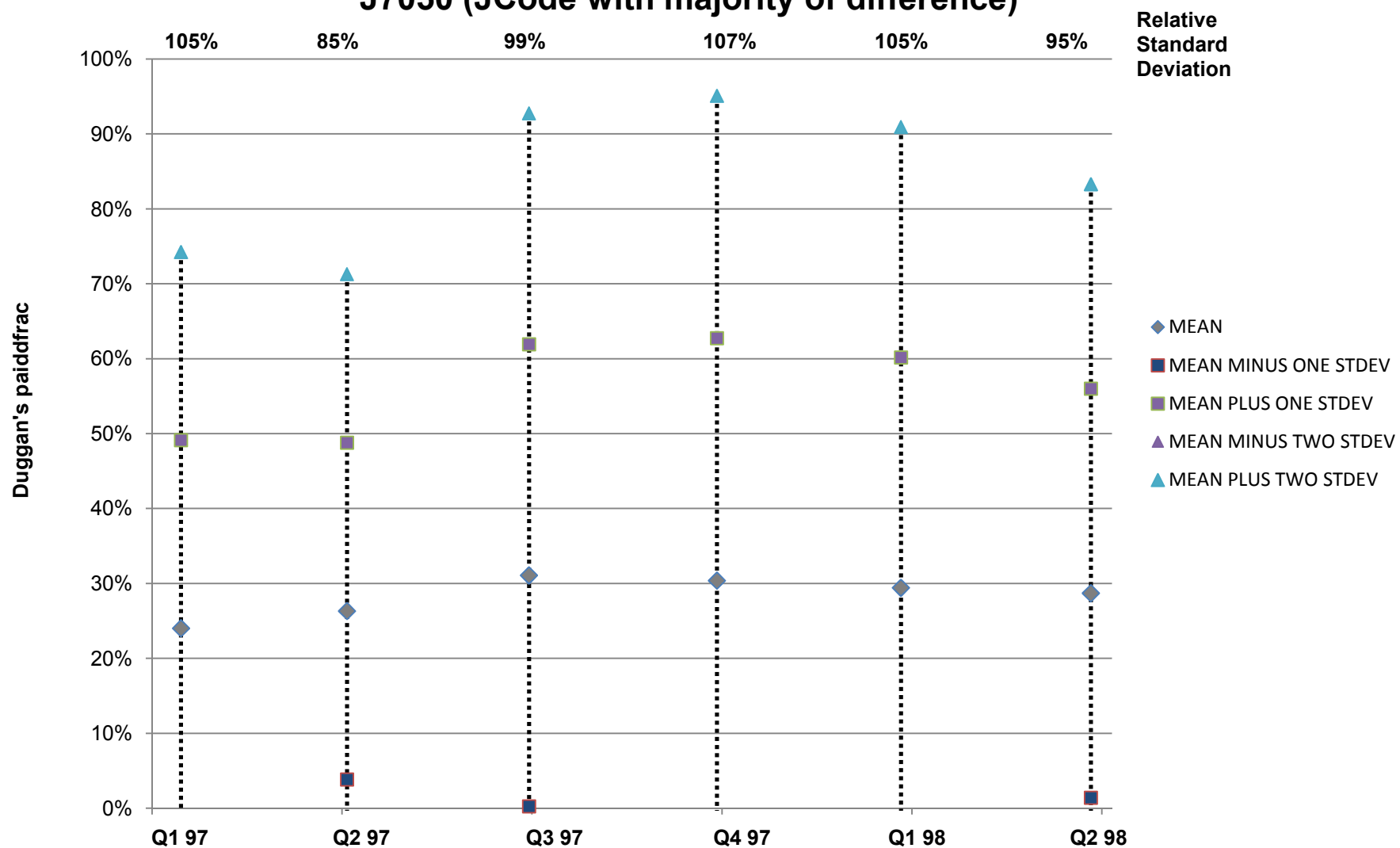**Dr. Duggan's Calculations Demonstrate Significant Variability Across the 19 States He Analyzed in the Impact of His Revised Prices - Top 6 NDCs (Greater than $5MM in Expenditures) 1999 Q4 (Highest Expenditure Quarter)**

Mean | Max | Min

Y-axis: Duggan's Difference Fraction (0% to 100%)

X-axis categories: VANCOMYCIN 1 GM VIAL (00074653301), SODIUM CHLORIDE 0.9% IRRIG. (00074613802), VANCOMYCIN 5 GM VIAL (00074650901), BACTERIOSTATIC SALINE VIAL (00074196607), SODIUM CHLORIDE 0.9% IRRIG. (00074713809), SODIUM CHLORIDE 0.9% SOLN (00074710123)

Ordered Left to Right by Expenditure

Source: Dr. Duggan "38" dta files; Additional 9 State "log" files as summarized in Medicaid_Diff_Frac.Variation.xls

**Standard Deviation of Difference Fractions Across the 19 States Dr. Duggan Analyzed
- Top 6 NDCs (Greater than $5MM in Expenditures)
1999 Q4 (Highest Expenditure Quarter)**

Legend: ◆ Mean   ■ Mean + 1 StDev   ■ Mean - 1 StDev   ▲ Mean + 2 StDev   ▲ Mean - 2 StDev

Y-axis: **Duggan's Difference Fraction** (0% to 100%)

X-axis categories:
- VANCOMYCIN 1 GM VIAL (00074653301)
- SODIUM CHLORIDE 0.9% IRRIG. (00074613802)
- VANCOMYCIN 5 GM VIAL (00074650901)
- BACTERIOSTATIC SALINE VIAL (00074196607)
- SODIUM CHLORIDE 0.9% IRRIG. (00074713809)
- SODIUM CHLORIDE 0.9% SOLN (00074710123)

Ordered Left to Right by Expenditure

Source: Dr. Duggan "38" dta files; Additional 9 State "log" files as summarized in Medicaid_Diff_Frac.Variation.xls

Dr. Duggan's Calculations Demonstrate There is No Consistent Pattern *Across Carriers* in the Impact of His Revised Prices J7050 (JCode with majority of difference)

Duggan's Paiddfrac (y-axis): 0% to 100%

X-axis: Q1 97, Q2 97, Q3 97, Q4 97, Q1 98, Q2 98

Legend:
- ◆ Connecticut General
- ■ Florida Blue Shield
- ▲ Other Metra Health
- ● WPS

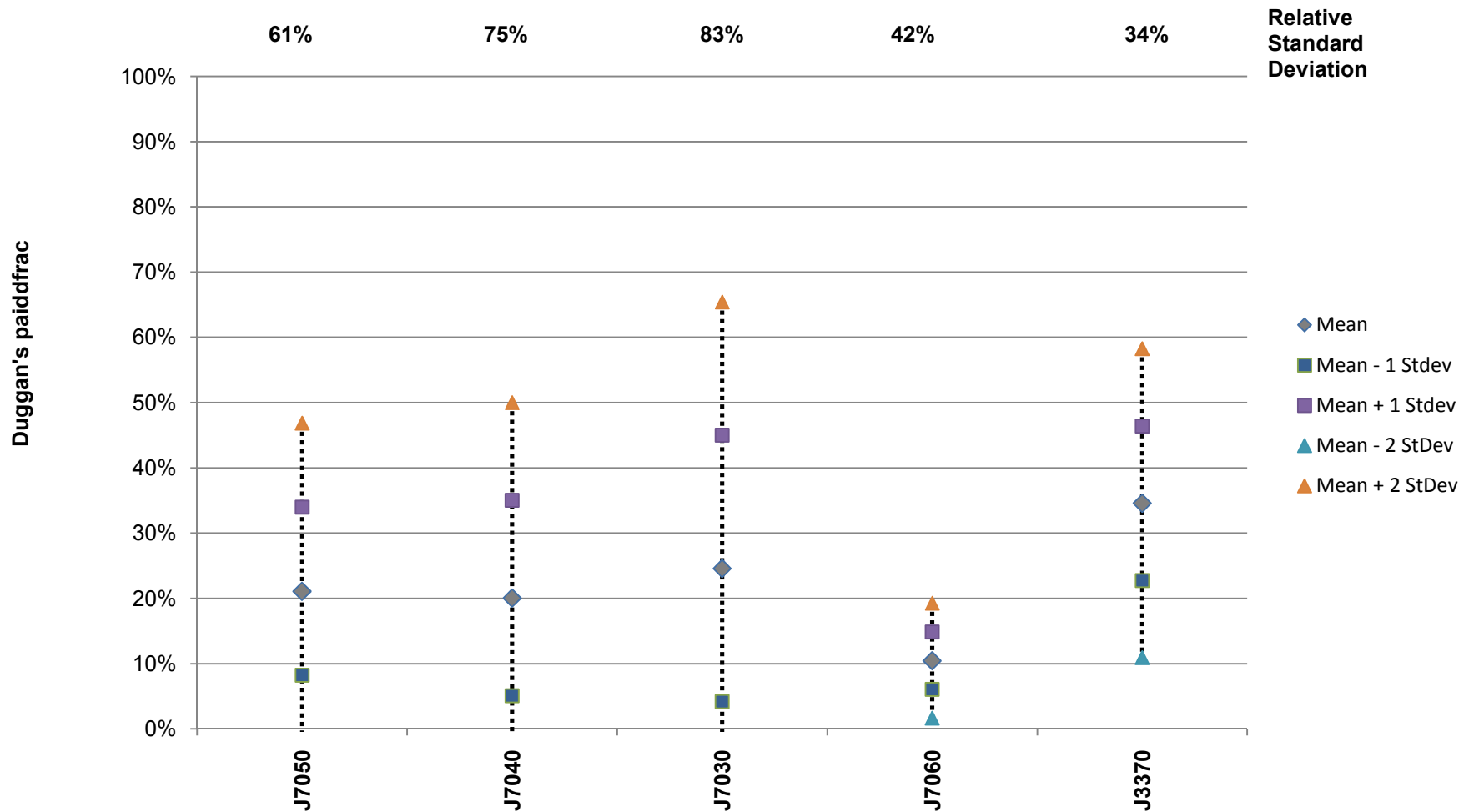Source: cigna9701q.dta, flbs9598q.dta, mh9501q.dta, wps9701q.dta, as summarized in Medicare_Diff_Frac_Variation_Charts.xls

Standard Deviation of Dr. Duggan Paid Fractions *Across Carriers*
(Quarters with 4 arrays)
J7050 (JCode with majority of difference)

Relative Standard Deviation

| 105% | 85% | 99% | 107% | 105% | 95% |

Duggan's paiddfrac

Legend:
- ◆ MEAN
- ■ MEAN MINUS ONE STDEV
- ■ MEAN PLUS ONE STDEV
- ▲ MEAN MINUS TWO STDEV
- ▲ MEAN PLUS TWO STDEV

X-axis: Q1 97, Q2 97, Q3 97, Q4 97, Q1 98, Q2 98

Source: cigna9701q.dta, flbs9598q.dta, mh9501q.dta, wps9701q.dta, as summarized in Medicare_Diff_Frac_Variation_Charts.xls

Even Dr. Duggan's Weighted Average Difference Fraction Demonstrates That There is No Consistent Pattern *Across Carriers* in the Impact of His Revised Prices
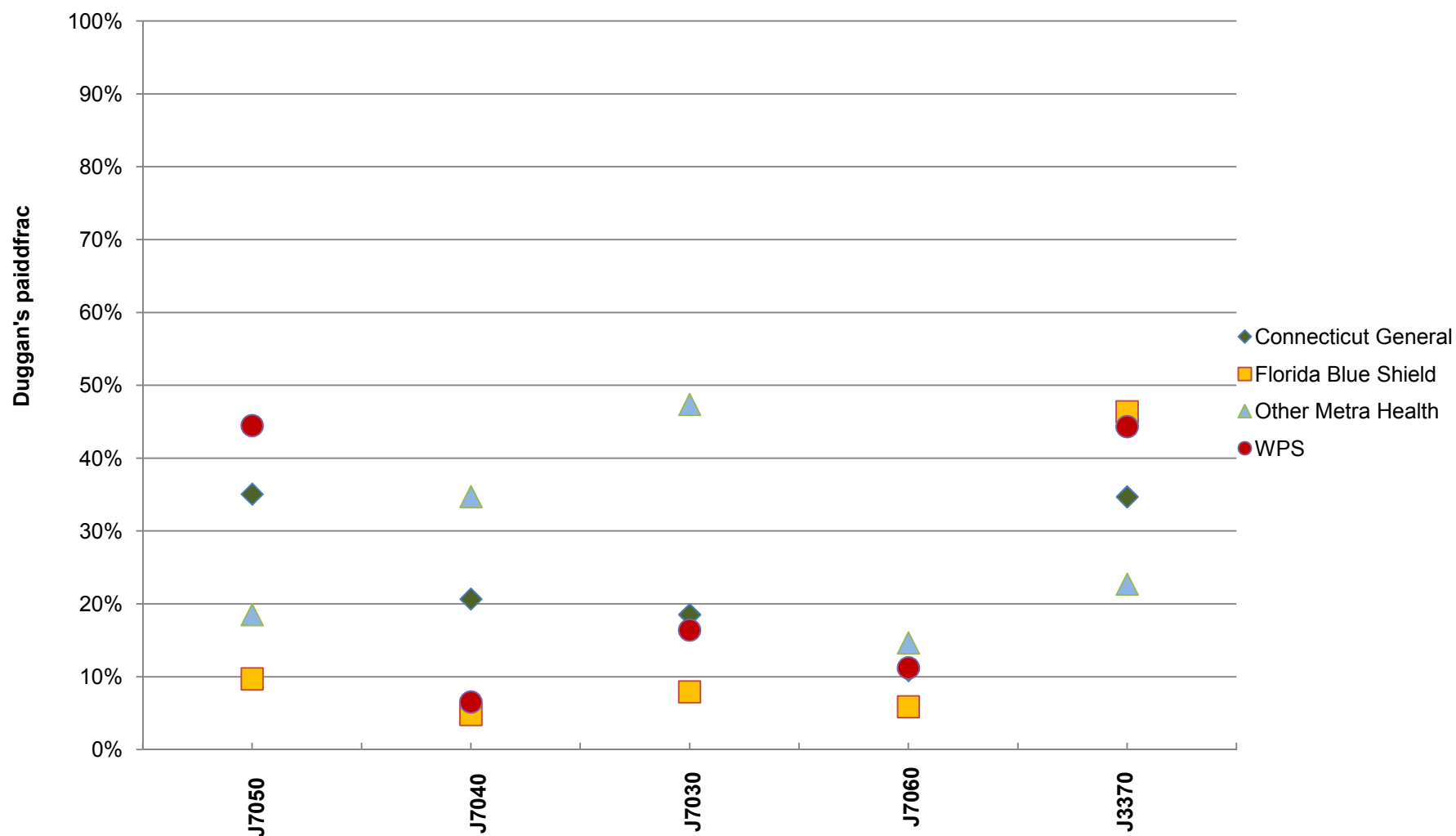
Duggan's paiddfrac

- Connecticut General
- Florida Blue Shield
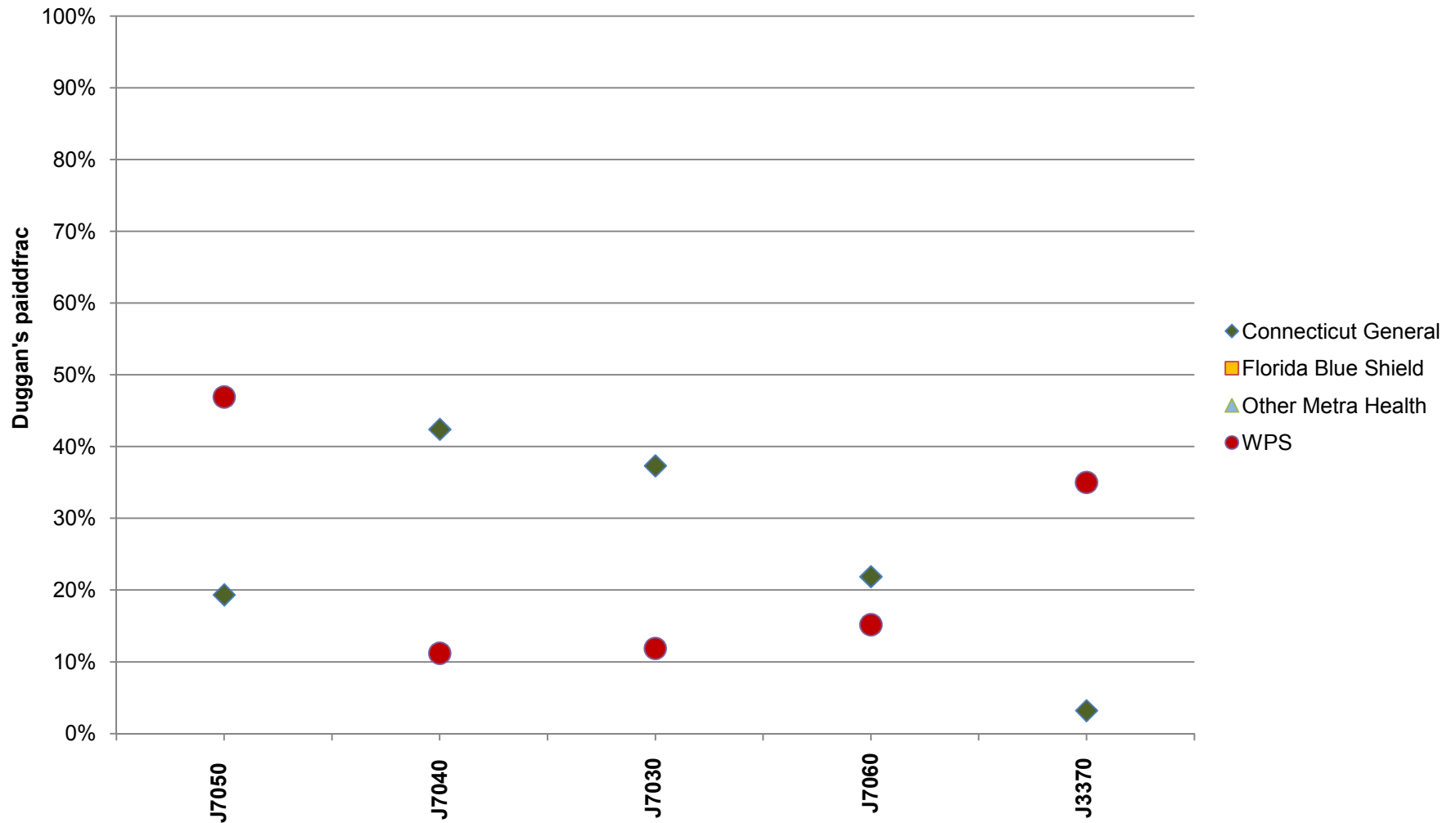- Other Metra Health
- WPS

J7050 J7040 J7030 J7060 J3370

Ordered left to right by highest expenditure.
Source: cigna9701q.dta, flbs9598q.dta, mh9501q.dta, wps9701q.dta, as summarized in Medicare_Diff_Frac_Variation_Charts.xls
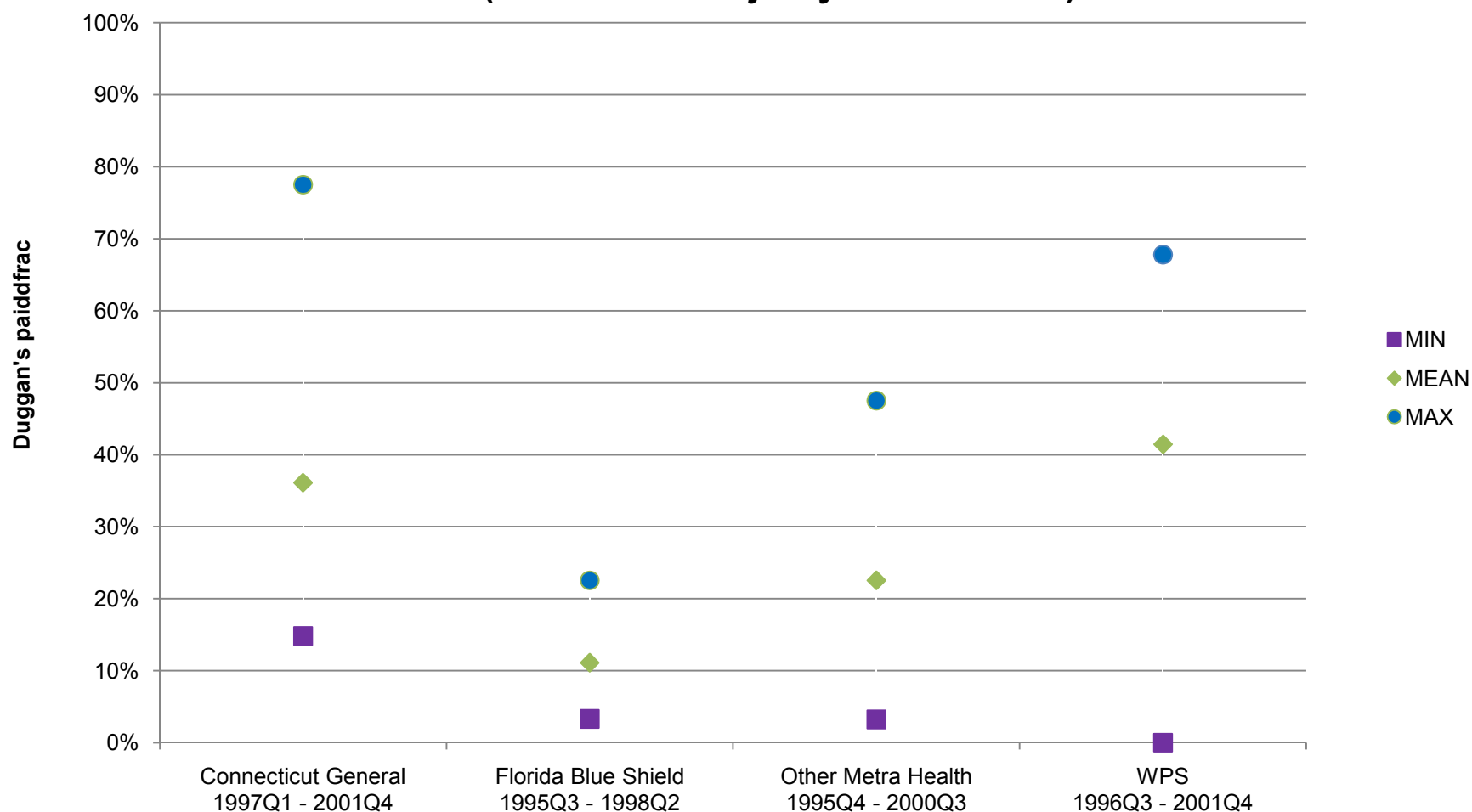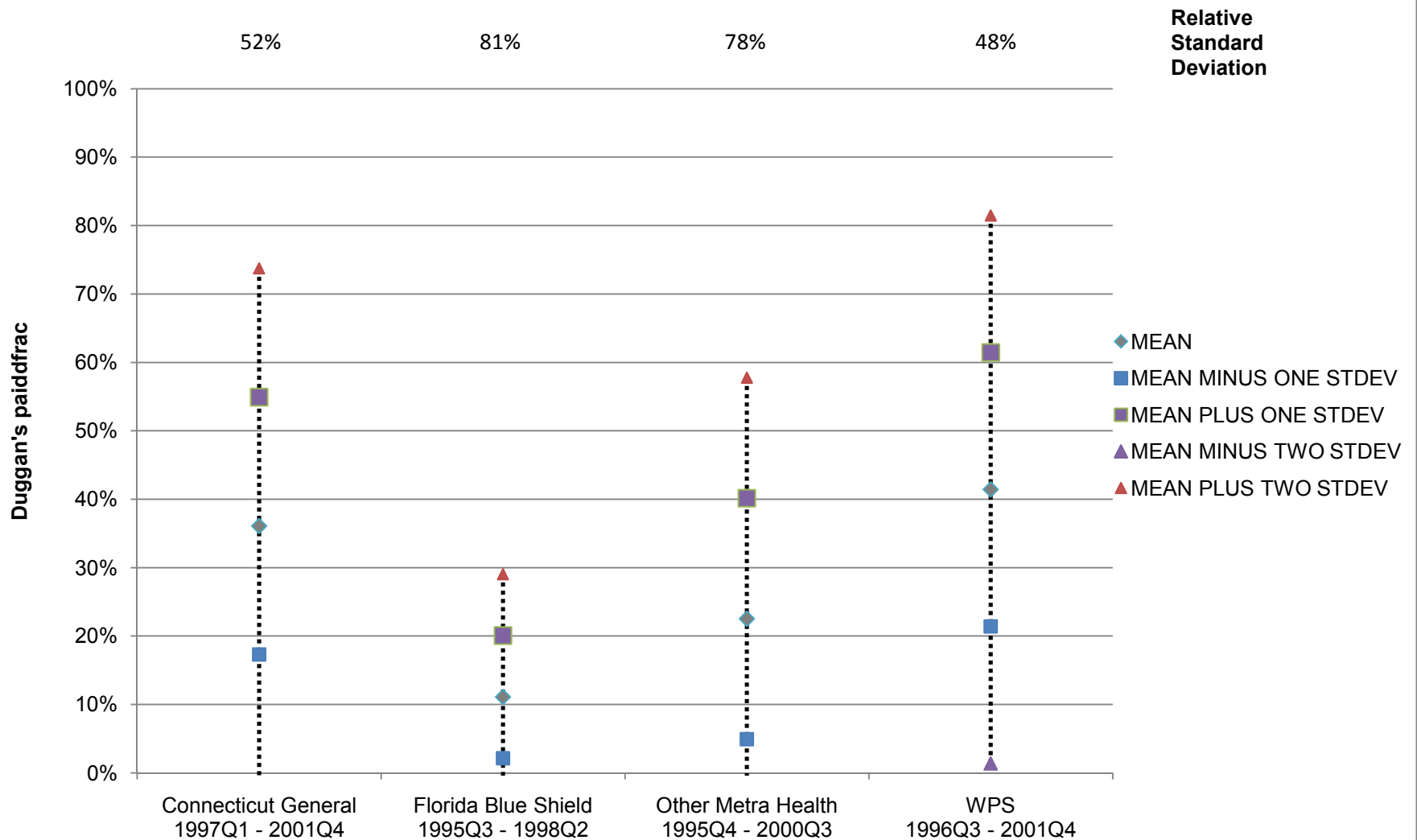
Standard Deviation of Dr. Duggan Weighted Average Difference Fraction *Across Carriers*

Relative Standard Deviation

61%   75%   83%   42%   34%

Duggan's paiddfrac

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%

J7050   J7040   J7030   J7060   J3370

Legend:
◆ Mean
■ Mean - 1 Stdev
■ Mean + 1 Stdev
▲ Mean - 2 StDev
▲ Mean + 2 StDev

Ordered left to right by highest expenditure.
Source: cigna9701q.dta, flbs9598q.dta, mh9501q.dta, wps9701q.dta, as summarized in Medicare_Diff_Frac_Variation_Charts.xls

For the Highest Expenditure Quarter (Q2 2001), Dr. Duggan Has Only Two (Highly Variable) Arrays per JCode

Ordered left to right by highest expenditure.
Source: cigna9701q.dta, flbs9598q.dta, mh9501q.dta, wps9701q.dta, as summarized in Medicare_Diff_Frac_Variation_Charts.xls

Dr. Duggan's Calculations Demonstrate There is No Consistent Pattern *Within Carriers* Across Time in the Impact of His Revised Prices
J7050 (JCode with majority of difference)

Source: cigna9701q.dta, flbs9598q.dta, mh9501q.dta, wps9701q.dta, as summarized in Medicare_Diff_Frac_Variation_Charts.xls

Standard Deviation of Dr. Duggan's Difference Fractions

- Under Dr. Duggan's analysis, there are *difference fractions* for *each State-NDC-quarter* (Medicaid) and *each Carrier-J-Code-quarter* (Medicare) for which Dr. Duggan performed a "claim-by-claim" difference analysis.

- The difference fractions show the *percentage difference in reimbursements* that allegedly would have occurred using his but-for Average Selling Prices across those States and Carriers where he performed a claim-by-claim analysis.

  - Example: $10,000 difference divided by $20,000 in reimbursements = 50% difference fraction.

- Because Dr. Duggan uses the same but-for Average Selling Prices across States and Carriers, *variability in the difference fractions informs us about the variability in how reported prices impacted payments across States and Carriers*.

  - If the impact of reported prices across States and Carriers is roughly the *same*, then we would expect the calculated difference fractions to also be roughly the same. Such a situation would yield low Standard Deviations and low Relative Standard Deviations in the difference fractions across States and Carriers.

  - If the impact of reported prices across States and Carriers is *variable*, then we would expect the calculated difference fractions to vary. Such a situation would yield higher Standard Deviations and higher Relative Standard Deviations in the difference fractions across States and Carriers.

- The *difference fractions* Dr. Duggan computes from his "samples" of States and Carriers serve as the *foundation* of his *extrapolations* to other States and Carriers. *Substantial variation in Dr. Duggan's difference fractions reduces the precision and reliability of his findings.*

- Substantial variation in Dr. Duggan's difference fractions *emphasizes the importance of using valid samples which are random and representative of all claims being analyzed*.

Standard Deviation

- Widely used measure of the *variability* or *dispersion* of data points.

- Tells us *how far from the mean* the data points tend to be. Assuming a normal distribution, *68%* of the data points will be *+/- 1 Standard Deviation* from the mean and *95%* of the data points will be *+/- 2 Standard Deviations* from the mean.

- A *large* Standard Deviation indicates that the data points are *far from the mean*. A *small* Standard Deviation indicates that they are *clustered closely around the mean*.

- Example:

    - Population one = 0, 0, 14, 14; Population two = 0, 6, 8, 14; Population three = 6, 6, 8, 8.

    - Each has a mean of 7, but the standard deviations are much different – 7, 5 and 1, respectively.

- Standard Deviation may be used in evaluating the *reliability of an estimate*.

- Relative Standard Deviation

    - Standard Deviation divided by the mean.

    - States, as a percentage, the distance of one Standard Variation from the mean.

    - Example: Standard Deviation of 15 on a mean value of 40 = 37.5% Relative Standard Deviation.